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WATER POLLUTION SURVEY
OF THE
POLICE VILLAGE OF
CHUTE A BLONDEAU
TOWNSHIP OF
EAST HAWKESBURY
COUNTY OF PRESCOTT

1977

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WATER POLLUTION SURVEY

OF THE

POLICE VILLAGE OF CHUTE A BLONDEAU

TOWNSHIP OF EAST HAWKESBURY

- 1977 -

Prepared by:

The Municipal & Private
Abatement Section, Cornwall,
Southeastern Region,
Ontario Ministry of the Environment

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INTRODUCTION

Staff from the Municipal and Private Abatement Section of the Southeastern Ontario Regional offices of the Ministry of Environment, completed a Municipal Water Pollution Survey of the Police Village of Chute a Blondeau, during the months of June and August of 1977.

This study was primarily undertaken to update data collected in a survey conducted by the Ontario Water Resources staff in 1972, and to collect water samples as a means of determining quality of land drainage within the confines of the Police Village.

The following people were interviewed during the course of the survey:

1) R. Brunette, Clerk-Treasurer
Township of East Hawkesbury

2) Mr. R. Leblanc, Senior Health Inspector
Eastern Ontario Health Unit
L'Orignal, Ontario

PREVIOUS RECOMMENDATIONS AND ACTION TAKEN

A previous survey was conducted by the Ontario Water Resources in 1972 to ascertain the extent of stream pollution in this community. The report concluded with this recommendation: "A program should be indicated at the Police Village of Chute a Blondeau to eliminate contaminated sewage discharges to local storm sewers and drainage ditches." Since that time, there has been little or no action taken to significantly improve this situation.

GENERAL

The Police Village of Chute a Blondeau is located in the northern section of the Township of East Hawkesbury. The village lies immediately adjacent to the Ottawa River and is approximately 8 miles east of the Town of Hawkesbury.

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The Police Village is developed primarily along an east-west axis, along a section of County Road No. 4. It is bounded on the north by the Ottawa River.

The population of this community is about 391 (1976 assessment figure), and has changed little in the past 5 years from the previous survey. There is no industry, aside from a few commercial establishments and retail outlets. Chute a Blondeau is largely residential, and it is presumed that most of these people commute to work in Hawkesbury, or are pensioners.

TOPOGRAPHICAL AND GEOLOGICAL CONDITIONS

The community of Chute a Blondeau is located on a rolling section of land adjacent to the Ottawa River. Both gravel and clay soils predominate over the land area. The clay soils are found largely along the river channel, and are of marine origin. The gravel soils make up the remainder of the village, interspersed with pockets of sandy soil. The underlying rock formation is limestone, commonly referred to as the Ottawa Formation. In the Village of Chute a Blondeau, this rock formation occurs close to the surface in several locations. The influence of this bedrock formation on the village is considerable, with respect to both physiography and drainage.

Well records for the area indicate that this rock formation is encountered between the elevations of 8 to 15 feet.

SEWAGE DISPOSAL

Generally, sewage wastes are directed to individual septic tank systems, and a few outdoor privies are used. It was found, however, through a recent survey conducted by the Eastern Ontario Health Unit, and a previous Ontario Water Resources survey, that a large portion of these systems are inoperative, and the wastes are directed mainly to the storm sewer network. Several instances of domestic discharges to the local drainage system were observed at the time of this investigation, and it was suspected that it was common practice to dispose of basin and laundry wastes

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in the same manner.

The report by the Eastern Ontario Health Unit indicated that about 50% of these existing disposal systems are substandard. The majority of substandard cases were reported to be malfunctioning tile bed systems, or direct connections to the storm sewer network. These substandard practices have evolved largely because of the limited amount of overburden material, which does not allow for suitable attenuation of the sewage wastes. Other reasons are: minimum lot sizes, and many shallow well supplies.

WATER SUPPLY

Water for domestic use is obtained from individual well supplies. In a recent report prepared by the Eastern Ontario Health Unit, it was established that 55% of the well samples collected showed some degree of contamination.

LAND DRAINAGE

The existing drainage network consists largely of open ditches, although some parts of the main street are serviced by storm sewers. These sewers outlet directly into the Ottawa River.

During our investigation, it was observed that at several catch basin locations, cardboard material had been placed over the grate. One of the local residents indicated that this was done to prevent the odour of raw sewage from permeating the street environment.

The surface water samples collected during this survey indicated that runoff within the village causes a great deal of contamination. These results are shown in tables, illustrated in the appendices of this report.

SANITARY SURVEY

In February and March 1977, a door-to-door survey was conducted in Chute a Blondeau by the Eastern Ontario Health Unit, at the request of the

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Township of East Hawkesbury. The purpose of this survey was to evaluate the extent of contamination in individual water supplies, and to determine the adequacy of existing sewage disposal systems.

A total of 77 homes were visited and the occupants interviewed. Information was gathered regarding the type of wells and their depth, and the sewage system serving the dwelling. In a letter dated May 30, 1977, from the Eastern Ontario Health Unit, a summary of the survey results was reported to Mr. R. Brunette, Clerk of the Township of East Hawkesbury. The results of this survey indicated that approximately 50% of the dwellings had substandard sewage systems, and rectifications of these systems could not easily be accomplished because of the following factors:

1) Poor location of existing private water supplies on individual lots.
2) 25% of the well supplies are considered shallow well or surface water supplies.
3) Residential properties immediately adjacent to the Ottawa River are inclined steeply to the river bed, causing significant difficulties in tile bed construction.
4) Similarly, homes located on the south side of the main street have an ascending elevation to the south, again causing difficulties in the bed construction.
5) There are some existing lots that are less than the minimum requirement of 15,000 square feet in area.
6) Soil conditions are considered fair to poor for the installation of conventional sewage systems.

WATER POLLUTION SURVEY

Results and Interpretation

Water samples were collected at the various locations throughout the village, and analyzed for bacteriological and chemical contaminants. The sampling points are indicated on the map accompanying this report, and further outlined in detail below. The results are tabulated in the appendices. A total of 29 samples were collected from 7 locations. Samples were bacteriologically examined at the Ministry of Environment

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laboratory, utilizing the Membrane Filter Method (Appendix I). The chemical samples were also analysed at the Ministry laboratory. The results, and discussions of the meaning of the results, are appended to this report as follows:

Appendix I - Significance of Bacteriological Examinations
Appendix II - Membrane Filter Technique
Appendix III - Bacteriological Sample Results
Appendix IV - Significance of Chemical Analysis
Appendix V - Chemical Sample Results

A description of the major sampling stations and amounts in the results of samples collected at these stations are as follows:

1 - Main Street East (Sample No. 201 & 201A)

- Samples were collected from the sewer outfall and catch basin. The bacteriological counts were extremely high on both occasions. The chemical sample result also showed an extremely high BOD and suspended solids content. During sampling, it was noted that the septic odour was pronounced, and there was evidence of sewage waste in the water.

# 2 - Street "A" - East and West Side (Sample No.'s 202 & 202A)

- Samples were collected from outfalls on both sides of the street. The bacteriological counts were high on all samples. The chemical analyses, however, showed BOD results of 14 and 36, and a suspended solids count of 190 and 40. This reflected some contamination problems, but not as serious as those indicated at the location above.

3 - Street "B" - East Side (Sample No. 203)

- Samples were collected only from the open ditch on the East side, South of Main Street. The bacteriological counts were high, and the chemical results showed some contamination, but not as serious as at # 1 location.

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# 4 - Main Street - Centre - North Side (Sample No. 204)

- At this location, in the central part of town, samples were collected from a sewer outfall. The bacteriological analyses showed extremely high counts, and the chemical results indicated a contamination problem. This outfall clearly indicated strong evidence of sewage wastes being discharged.

# 5 - Main Street West - "North Side" (Sample No. 205)

- Samples were collected from a large corrugated iron pipe, which acted as a sewer outfall. The coliform counts were high, and the chemical results showed contamination of the water. The water flow at the time of sampling was minimal.

# 6 - Main Street East (Extreme End) (Sample No. 206)

- Samples were collected from the outfall pipe located immediately west of a local service station. The bacteriological results showed some contamination, as did the chemical results, but not quite as serious as in previous locations.

SUMMARY OF RESULTS

All of the samples collected from the storm sewer outfalls and ditches indicated extremely high coliform counts. The chemical analyses also indicated that the BOD_5 and the suspended solids concentration were very high - particularly those taken from all storm sewer outfalls.

The bacteriological sample results clearly showed that runoff from the existing community drainage network is being polluted. The results from the storm sewer outfalls indicate that their discharges are contaminating the Ottawa River.

These results substantiate those obtained by the Eastern Ontario Health Unit - that domestic waste is gaining access to the storm sewer and storm ditch systems. Elimination of these discharges to the sewer network, and proper waste disposal systems, should resolve the problem of contamination in this area.

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CONCLUSION AND RECOMMENDATION

Investigations have been made by Ontario Water Resources staff in 1972 to assess the unsanitary conditions and the associated pollution of the Ottawa River. This survey indicated that sewage wastes were being discharged to the storm sewer network, and subsequently to the Ottawa River, causing a deleterious effect on water quality of the river.

Further investigations of these same locations in June and August of 1977 by staff from the Ministry of Environment, Cornwall district office, have revealed that this situation is unchanged. Sewage wastes are continuing to be discharged to the stream, and the river water is further degraded.

In a survey conducted by the Eastern Ontario Health Unit, it was shown that 50% of sewage disposal systems are malfunctioning, and that 55% of the well supplies are contaminated.

Therefore, it is concluded that the municipality should initiate action to develop a sewage works project to eliminate contamination of the local watercourses.

APPENDIX I

SIGNIFICANCE OF BACTERIOLOGICAL EXAMINATIONS

Total coliform organisms include a wide variety of bacteria ranging from the genus (group) Escherichia Coli (E. Coli), which originate mainly in the intestines of man and other warm-blooded animals, to the genera Citrobacter and Enterobacter aerogenes. The latter genera are basically found in soil, but are also present in feces in small numbers. The presence of total coliforms in water may indicate soil runoff or, more importantly, less recent fecal pollution, since organisms of the Enterobacter-Citrobacter groups tend to survive longer in water than do members of the Escherichia Coli group, and even to multiply when suitable environmental conditions exist.

The Fecal Coliform organisms are those coliform bacteria that are of intestinal origin, and therefore, are an indicator of recent fecal pollution. Most of the coliform bacteria found by the fecal coliform test are of the genus, Escherichia Coli.

Fecal Streptococci organisms are normal inhabitants of the large intestine of man and animals, and generally, do not multiply outside the human body. In waters polluted with fecal material, fecal streptococci are usually found along with fecal coliform bacteria, but in smaller numbers. When the number of fecal streptococci bacteria approximates or is greater than the number of fecal coliform organisms, animals are the probable source.

The Ministry of Environment Guidelines for Water Quality Management in Ontario (1974), indicate that water used for total body contact recreation can be considered impaired when the total coliform, fecal coliform and/or fecal streptococcus geometric mean density exceeds 1000, 100, and/or 20 per 100 ml.

APPENDIX II

MEMBRANE FILTER TECHNIQUE

A filtration technique for enumerating coliform bacteria in water was developed during the early 1940's. It has been accepted as a standard for the sanitary quality of water. A portion of the sample is passed through a cellulose acetate filter membrane of such porosity as to retain bacteria while permitting the water to pass through freely. The filter membrane is then placed aseptically in a Petri dish on an absorbent pad saturated with a differential nutrient solution, such as M-Endo broth (buffered lactose-peptone-salts with bile salts and decolorized basic fuchsin) and incubated at 35°C. for 20 hours. The membrane is then examined by low-power microscopy, and purplish green colonies with a metallic sheen are counted. These are considered to be coliform bacteria.

The amount of sample to be filtered varies according to the nature of the specimen: 100 to 500 ml. of finished, municipal water may be examined, whereas 0.1 to 10 ml. of well water may yield 20 to 80 coliform colonies (the recommended density for most accurate counting). Greater precision is possible by the membrane filter technique than by the multiple lactose tube method of estimating coliforms, because larger volumes of samples can be examined, and results are secured more quickly. The method is limited, however, by the clogging of the filters with algae, colloidal and other materials, and by the inhibition of coliforms in specimens containing excessively high, noncoliform populations.

APPENDIX III

TABLE 1

BACTERIOLOGICAL ANALYSIS

VILLAGE OF CHUTE A BLONDEAU

WATER POLLUTION SURVEY

1977

DATE	SAMPLE NO.	LOCATION	TOTAL COLIFORMS	FECAL COLIFORMS	FECAL STREPTOCOCCUS
June 14	201	Main Street East North Side, Outfall	710,000,000	220,000	G 15,000.000
Aug. 15	201	"	15,000,000	G 150,000	1,000
June 14	201A	Main Street East South Side Catch Basin	G 150,000,000	650,000	10,000
Aug. 15	201A	NO FLOW			
June 14	202	Street "A", E. Side Ditch	6,900,000	47,000	700
Aug. 15	202	"	G 1,500,000	G 150,000	1.000
June 14	202A	Street "A", W. Side Catch Basin	34,000,000	G 150,000	15,000
Aug. 15	202A	"	G 1,500,000	G 150,000	1,000
June 14	203	Street "B", E. Side Ditch	340,000	5,000	140
Aug. 15	203	"	G 1,500,000	6,000	230
June 14	204	Main Street, North Central Sewer Outfall	146,000,000	G 150,000	L 100
Aug. 15	204	"	G 1,500,000	G 150,000	26.000
June 14	205	Main Street West North Side Sewer Outfall	90,000	4,100	150
Aug. 15	205	"	2,000,000	100,000	10,000
June 14	206	Main St. E, Extreme End, N. Side Outfall	21,000	1,480	8
Aug. 15	206	"	600,000	13,000	150

G = Greater than

APPENDIX IV

SIGNIFICANCE OF CHEMICAL ANALYSES

Biochemical Oxygen Demand (BOD)

The biochemical oxygen demand (BOD) of domestic and industrial waste waters is the amount of molecular oxygen required to stabilize the decomposable matter present in a water by an aerobic biochemical action. Since it is impractical in actual work to utilize tests that require more than a few days for reliable results, it is customary to make BOD tests at a standard temperature of 20°C for a 5-day period, which is about 68% of the ultimate, when a reaction velocity co-efficient of 0.10 is used. A high BOD is indicative of organic or chemical pollution.

In most cases, adequate protection for surface waters should be provided if BOD concentrations in waste discharges exceed 15 mg/l, but in some cases, a much higher concentration can be tolerated, while in other cases, a concentration less than 15 mg/l could be detrimental. Special situations have to be examined individually. This will ensure that the biochemical oxygen demand from the various sources, does not lower the oxygen concentration in the watercourse below 6-7 mg/litre and thus make the watercourse acceptable for various fresh water biota.

Suspended Solids

The suspended solids value is the most significant of the solids determination, and indicates the measure of the undissolved solids of an organic or inorganic nature. Organic solids create sludge banks and decompose, causing odours and unsightly conditions. Inorganic suspended solids blanket the stream bed affecting benthos organisms.

The effects of suspended solids in water are reflected in difficulties associated with water purification, decompositions in streams, and injury to the habitat of fish. In most cases, adequate protection for surface waters should be provided if suspended solids concentrations in waste discharges exceed 15 ppm.

Nitrogen

Total Kjeldahl is a measure of the total nitrogenuous matter present except that measured as nitrite and nitrate notrogens. The total kjeldahl less the ammonia nitrogen measure the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 015 mg/l.

Phosphorous

This element is commonly found in nature in the form of phosphates (PO_4). Raw or treated sewage, some industrial wastes, and agricultural drainage contain significant concentrations of phosphate. The laboratory provides two phosphorous determinations: Total phosphorous and soluble phosphorous; Total phosphorous includes orthophosphate, polyphosphate and organic phosphorous, while soluble phosphorous represents orthophosphates only.

Phosphorous is an essential nutrient for plant life, and like nitrogen, passes through cycles of decomposition and photosynthesis. Nitrogen and phosphorous are both essential for the growth of algae, and limitation of these compounds controls their growth rate. Generally, soluble phosphorous in concentrations of 0.01 mg/l or greater, at the beginning of the growing season, may cause algae nuisance conditions.

APPENDIX V

TABLE 2

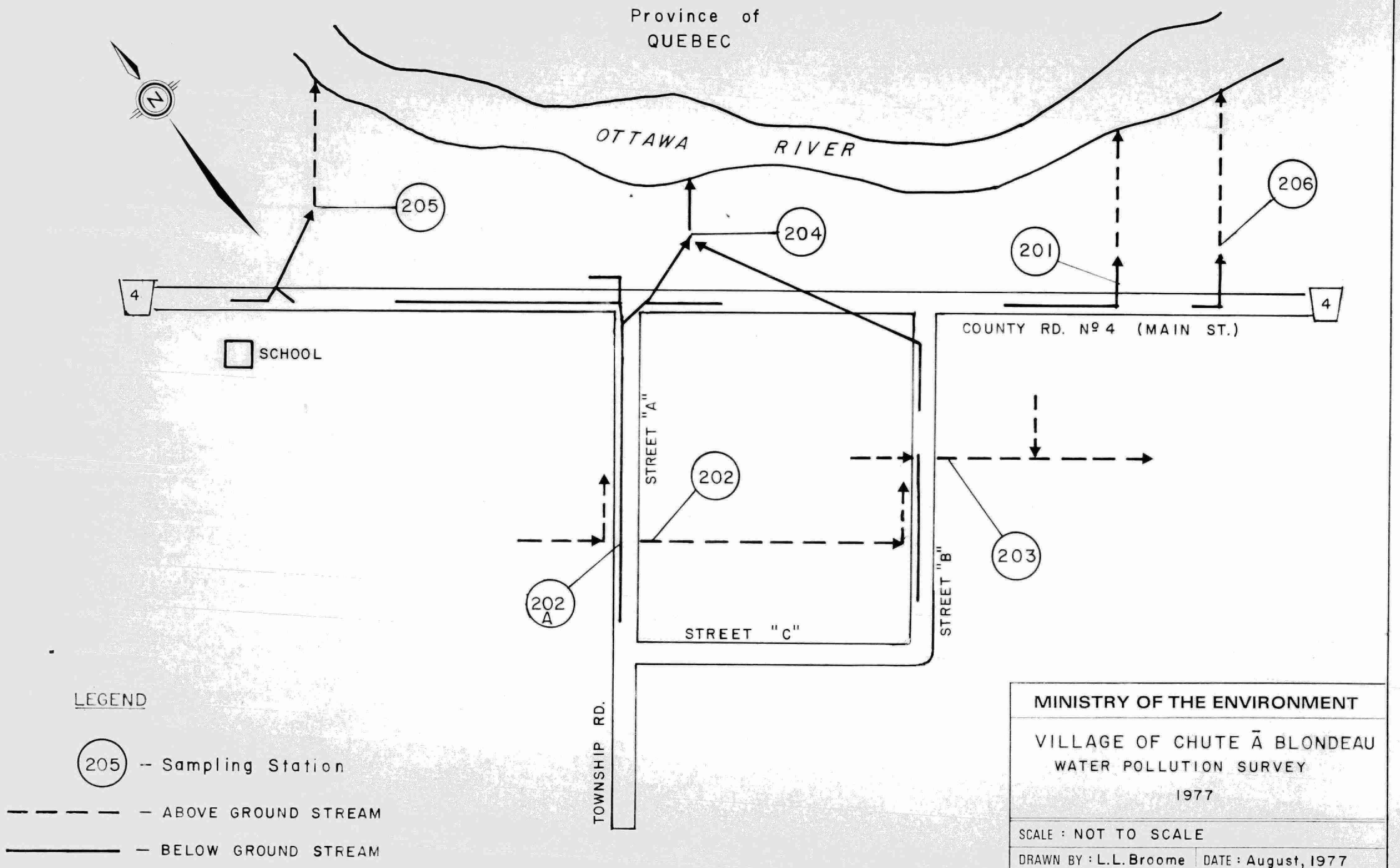
CHEMICAL ANALYSIS

VILLAGE OF CHUTE A BLONDEAU

WATER POLLUTION SURVEY - 1977

DATE	SAMPLE NO.	LOCATION	5-DAY BOD	SUSPENDED SOLIDS	TOTAL KJELDAHL	TOTAL PHOSPHORUS	CONDUCTIVITY UMHOS/CM	MBAS
June 14	201	Main St. East, Sewer Outfall North Side	550	1100	38	21	1600	50
Aug. 15	201	"	G 300	270	110	24		
June 14	202	Street "A", East Side Ditch	14	190	5.3	1.80	490	0.1
Aug. 15	202	"	L 8	15	L .2	1.24		
June 14	202A	Street "A", West Side Catch Basin	36	40	11	1.80	600	0.2
Aug. 15	202A	"	38	50	5.0	3.6		
June 14	203	Street "B", East Side Ditch	26	390	9.3	4.5	480	0.1
Aug. 15	203	"	10	15	3.2	1.44		
June 14	204	Main Street Central Sewer Outfall	34	20	9	2.6	670	1.1
Aug. 15	204	"	95	50	10	8.4		
June 14	205	Main Street West, North Side Sewer Outfall	10	60	8	6.5	1510	
Aug. 15	205	"	75	170	9	11.6		
June 14	206	Main St. East, North Side (Extreme end)	6	L 15	1.0	.70	450	
Aug.	206	"	L 8	L 15	.10	.16		

G = Greater than
L = Less than



MINISTRY OF THE ENVIRONMENT

VILLAGE OF CHUTE Ā BLONDEAU
WATER POLLUTION SURVEY
1977

SCALE : NOT TO SCALE
DRAWN BY : L.L. Broome
DATE : August, 1977
CHECKED BY : D.H.M.
DRAWING NO. 7196

96936000009386